Patent Claims

1. A shaft drive unit (1), in particular an electrical drive unit (2) for driving a wheel shaft (3) for use in vehicles;

1.1 having an electrical machine (4) comprising a rotor (6) and a stator (7);

1.2 having a transmission unit (5), comprising at least one input (8) which can be connected in a rotationally fixed manner to the rotor (6) of the electrical machine (4), and at least one output (9.1, 9.2) which can be connected in a rotationally fixed manner to the wheel shaft (3);

1.3 the electrical machine (4), the input (8) and the output (9.1, 9.2) of the transmission unit (5) and the wheel shaft (3) being arranged coaxially with respect to one another; and

1.4 the electrical machine (4) having at least one associated converter unit (11) and one associated braking resistor unit (10);

distinguished by the following features:

1.5 the converter unit (11) is combined with the electrical machine (4) to form a physical unit (20);

1.6 the braking resistor unit (10) is arranged in the immediate physical vicinity of the electrical machine (4) and around the circumference of the input or output drive shaft (28) of the electrical machine (4) or of the wheel shaft (3).

2. The shaft drive (1) as claimed in claim 1, wherein means are provided for mechanical connection of the converter unit (11) to the electrical machine (4).

3. The shaft drive unit (1) as claimed in claim 2, wherein means are formed for electrical coupling of the converter unit (11) to the electrical machine (4), and means are formed for mechanical coupling of the same components.

4. The shaft drive unit (1) as claimed in one of claims 1 to 3, wherein the convertor unit (11) is arranged on the external circumference (14) of the housing (12) of the electrical drive machine (4).

5. The shaft drive unit (1) as claimed in one of claims 1 to 4, wherein the converter unit (11) is arranged in the housing of the electrical drive machine (4).

6. The shaft drive unit (1) as claimed in one of claims 1 to 3, wherein the converter unit (11) is arranged on one end surface (13) of the electrical drive machine (4).

7. The shaft drive unit (1) as claimed in one of claims 2 to 6, wherein the means for mechanical coupling between the electrical machine (4) and the converter unit (11) associated with it comprise connection means (21, 22) whose elements (4, 11) which are to be connected to one another are designed to be mutually complementary and to allow a force-fitting connection.

8. The shaft drive unit (1) as claimed in one of claims 2 to 6, wherein the means for mechanical coupling between the electrical machine (4) and the converter unit

(11) associated with it comprise connection means (21, 22) which are designed to be mutually complementary and allow an interlocking connection.

9. The shaft drive unit (1) as claimed in one of claims 1 to 8, distinguished by the following features:

9.1 a large number of braking resistor units (10.1, 10.2, 10.3) are provided;

9.2 the braking resistor units (10.1, 10.2, 10.3, 10.4, 10.5) are grouped, in one view, onto the wheel shaft (3) in the axial direction in a plane in an annular shape around the circumference of the input or output drive shaft (28) of the electrical machine (4) or of the wheel shaft (3).

10. The shaft drive unit (1) as claimed in one of claims 1 to 9, wherein each braking resistor unit (10.1, 10.2, 10.3) has a geometrical structure which, in the circumferential direction of the input or output drive shaft (28) of the electrical machine (4) or of the wheel shaft (3), at least partially encloses said input or output drive shaft (28).

11. The shaft drive unit (1) as claimed in claim 10, wherein the braking resistor unit (10.1, 10.2, 10.3) is designed in an annular shape.

12. The shaft drive unit (1) as claimed in claim 11, distinguished by the following features:

12.1 a large number of braking resistor units (10.1, 10.2, 10.3) are provided, and are arranged alongside one another;

12.2 the braking resistor units (10.1, 10.2, 10.3) are of modular construction, and can be mechanically and electrically coupled to one another.

13. The shaft drive unit (1) as claimed in one of claims 1 to 12, wherein the electrical machine (4) is in the form of a transverse flux machine.

14. A drive system

14.1 having a shaft drive unit (1) as claimed in one of claims 1 to 13;

14.2 having a power supply system for the shaft drive unit (1);

14.3 the power supply system comprising a fuel cell which is electrically connected to the electrical machine.

15. A drive system

15.1 having a shaft drive unit (1) as claimed in one of claims 1 to 13;

15.2 having a power supply system for the shaft drive unit (1);

15.2 the power supply system comprising an internal combustion engine, an electrical machine which can be mechanically coupled to it and can be operated as a generator in the traction mode, and an electrical coupling for connecting the power supply system to the electrical machine (4) for the shaft drive (1).